



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE BEFORE THE
BOARD OF PATENT APPEALS AND INTERFERENCES

Attorney Reference: 31433-44

In re Application of: Harrington et al. Art Unit: 1742
Serial No.: 10/673,816 Examiner: Wilkins
Filed: 9/29/2003 Appeal No.: TBD
Entitled: CAPACITOR CONTAINING ALUMINUM Conf. No.: 2218
ANODE FOIL ANODIZED IN LOW
WATER CONTENT GLYCERINE-
PHOSPHATE ELECTROLYTE

APPEAL BRIEF

Mail Stop Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

This is an appeal from the final rejection of the Examiner dated August 18, 2006 rejecting claims 1-15 and 19-32 of the application listed above. A Notice of Appeal was mailed January 17, 2007. The Brief is accompanied by the requisite fee set forth in §1.17(c).

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REAL PARTY IN INTEREST

This application is assigned to Kemet Electronics Corporation who is the real party in interest.

RELATED APPEALS AND INTERFERENCES

No related appeals and no relevant interferences are known to the appellant.

STATUS OF CLAIMS

Claims 1-15 and 19-32 are present as originally filed on September 29, 2003.

The rejection of claims 1-15 and 19-32 is appealed.

STATUS OF AMENDMENTS

There are no outstanding amendments.

SUMMARY OF THE CLAIMED SUBJECT MATTER

The invention is related to a process for preparing a capacitor. In general, a capacitor is prepared by forming an oxide coating on aluminum. The aluminum functions as the anode of the capacitor and the oxide functions as the dielectric. The present invention is focused on the manner in which the oxide is formed on the aluminum.

The claimed subject matter includes an initial step of pre-hydrating the aluminum. The pre-hydrated aluminum is then placed in an anodizing solution comprising glycerine, about 0.1 to

about 2.0%, by weight, water and about 0.01 to about 0.5 wt% orthophosphate. In one embodiment a voltage is applied to the aluminum plate which is excess of 220 volts. In another embodiment the voltage is applied sequentially wherein an applied voltage is maintained until the current decreases by 50% of the initial current after which the current is increased. The voltage is increased sequentially until the final voltage is achieved.

MAPPING OF INDEPENDENT CLAIMS TO SPECIFICATION

Claims 1 and 19 are the only independent claims. The subject matter of each independent claim is mapped to the specification as follows:

Claim 1. A process for preparing a capacitor comprising:

fabricating an aluminum plate (*paragraph [00021] line 2*);
pre-hydrating said aluminium plate(*paragraph [00032] line 2*);

contacting said plate with an anodizing solution comprising
glycerine (*paragraph [00027] line 3*), about 0.1 to
about 2.0%, by weight, water (*paragraph [00027] line 5*) and about 0.01 to about 0.5%, by weight,
orthophosphate (*paragraph [00027] line 4*);
applying a voltage to said aluminum plate of at least about
220 volts (*paragraph [00017] line 2*).

Claim 19. A process for preparing a capacitor comprising:

fabricating an aluminum plate (*paragraph [00021] line 2*);

pre-hydrating said aluminium plate (*paragraph [00032] line 2*);

contacting said plate with an anodizing solution comprising glycerine(*paragraph [00027] line 3*), about 0.1 to about 2.0%, by weight, water (*paragraph [00027] line 5*)and about 0.01 to about 0.5%, by weight, orthophosphate(*paragraph [00027] line 4*);

applying a voltage to said aluminum plate and determining an initial current(*paragraph [00031] lines 1-2 and paragraph [00030] lines 1-2*);

maintaining said first voltage until a first measured current is no more than 50% of said initial current (*paragraph [00031] line 4*);

increasing said voltage and redetermining said initial current (*paragraph [00031] lines 1-2*);

maintaining said increased voltage until a second measured current is no more than about 50% of said redetermined initial current(*paragraph [00031] line 4*), and

continuing said increasing said voltage and said maintaining said increased voltage until a final voltage is achieved (*paragraph [00030] lines 1-3*).

GROUND FOR REJECTION TO BE REVIEWED ON APPEAL

Appellant seeks review of the rejection of claims 1-15 and 19-32 under 35 U.S.C. 103(a) as being unpatentable over Kinard et al. (USP 5,837,121) in view of Ball et al. (USP 4,481,083).

ARGUMENTS

Claims 1-15 and 19-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kinard et al. (USP 5,837,121) in view of Ball et al. (USP 4,481,083).

Kinard et al. is cited as disclosing a method for preparing an anode plate for a capacitor including the steps of fabricating an aluminum plate. Applicants agree.

Kinard et al. is cited as teaching contacting the plate with an anodizing solution comprising glycerine, low amounts of water (inherently between 0.1 and 2.0 wt% due to absorption of water from the atmosphere), and 0.1-15 wt% dibasic potassium phosphate. Applicants disagree and opine that Kinard et al. teaches against the water content of the claimed invention.

Throughout the disclosure of Kinard et al., the amount of water is stated to be less than 1000 ppm (0.1 wt%). This is stated specifically at col. 4, lines 12 and 57. The Examiner

opines that the water content would be "inherently" within the claimed range without regard for the clear teachings in Kinard et al. regarding the necessity to heat the glycerine to insure a water content of less than about 1000 ppm water (see col. 9, lines 6-9). Kinard et al. further states in col. 9 lines 33-35 that a water concentration above about 1000 ppm gave rise to limiting thickness behavior.

The present application specifically states in paragraph [0029] that it is preferred to maintain the temperature between about 80 to 105°C in order to automatically maintain the water content between about 0.2 and 1%. If an unheated solution is used, as suggested by the Examiner, the water content of glycerine exceeds the limits set forth in the claims. The unheated glycerine will greatly exceed 2% water which is in direct contradiction to the inherency argument relied on by the Examiner.

Kinard et al. is cited as teaching that the thickness of the formed anodized layer was proportional to applied voltage.

The Examiner is selectively reading Kinard et al. to extract elements without relying on the context within which they are taught. The water content and temperature are taken together in a regime wherein non-limiting oxide growth occurs. As set forth primarily in col. 9 lines 6-11, the onset of non-

limiting growth kinetics occurred at about 125-150°C with glycerine which is heat treated to remove the water.

The Examiner specifically states that the rejection relies on the unheated glycerine solution disclosed in Kinard et al. (see page 3, lines 13-14 of the Final Action mailed 8/18/06). As pointed out above, the teachings attributed to Kinard et al. fail in the unheated glycerine solution and the water content in this instance would greatly exceed the claimed limit. On one hand, the Examiner is relying on properties which are only relevant to the heated glycerine while, on the other hand, attributing these properties to the unheated glycerine. Applicants respectfully submit that the position of the Examiner is inconsistent with the teachings of Kinard et al. and should be withdrawn.

The Examiner notes that Kinard et al. fails to expressly teach anodizing at more than 220 volts. Applicants agree. Applicants further submit that one of skill in the art would avoid extending the teachings of Kinard et al. to such a high voltage. First, the desired thickness can be achieved without such high voltages since the growth is not limited. Secondly, in col. 11, lines 8-15, Kinard et al. teaches that thick films can be achieved which would normally require hundreds of volts. It is only in hindsight that the Examiner would consider such

high voltage when it is neither necessary nor advised in Kinard et al.

Kinard et al. is cited as teaching that the thicker the anodized layer, the higher the operating voltage of the formed capacitor. It is clear from Kinard et al. that the dielectric properties of the oxide layer are complicated and not simply related to thickness. In col. 2 lines 3-8 the impact of the anodizing process on capacitance per surface area of valve metal is described. Dielectric enhancements are described in col. 2, lines 53-58. An oxide film which has an outer thick portion, for mechanical robustness, and a thin internal film, for capacitance, is described in col. 5 lines 37-40. The broad statement by the Examiner regarding the direct correlation between thickness and operating voltage is not believed to be clearly stated in Kinard et al.

The Examiner correctly notes that Kinard et al. fails to teach a "pre-hydrating" step and Ball et al. is relied on for teachings of a pre-hydrating step.

Ball et al. is cited as teaching that, in order for thicker anodized layers to be formed, the initial oxide layer on the aluminum must be depolarized. Applicants respectfully submit that the Examiner has taken the teachings of Ball et al. out of context and applied them in a way which is contrary to the teachings of Ball et al. Such a use of Ball et al. would only

be made in hindsight, and even then, it requires that the balance of the teachings of Ball et al. be ignored.

Ball et al. teaches anodization by first pre-hydrating to form a hydrous oxide layer followed by anodization in an aqueous solution of boric acid and 2 to 50 ppm phosphate. Applicants note that the level of phosphate is significantly below the lower level of orthophosphate of 0.01 wt% as recited in the independent claims.

If one attempted to use the anhydrous electrolyte of Kinard et al., they would be ignoring the requirement of an aqueous solution and boric acid as taught in Ball et al. As the Examiner has pointed out glycerine is hydroscopic. Based on the teachings of Ball et al., it is unclear how the use of glycerine as the anodizing solution would impact the pre-hydration step. Would the water be extracted from the surface? If so, would the advantages offered by pre-hydrating be defeated? Would there be sufficient water to eliminate the advantages offered by the dried glycerine? Clearly, Ball et al. utilizes an aqueous anodizing solution, so these concerns are not relevant therein. In spite of these perplexing questions, the Examiner has considered it obvious to combine the two teachings without regard for the extensive research that would be required to determine if such a combination would work. Such a conclusion can only be made in hindsight, motivated solely by the present

application. Even then, one of skill in the art would have no basis for any expectation of a positive result.

Even ignoring the conundrum created by the water, one would expect difficulties stemming from the phosphate. If one attempted to use the orthophosphate levels of Kinard et al., it would be expected to be detrimental due to the electrolyte scintillating at the foil interface producing damaged unstable foil as set forth in col. 1 lines 59-61 of Ball et al.

In summary, the anodizing solutions of Kinard et al. and of Ball et al. both recite three elements. None of the three elements are similar, and two of the three (water and phosphate) are in direct conflict. It is inconceivable that one of skill in the art would consider combining these references, even in a hindsight effort to reach a conclusion of obviousness. Applicants respectfully request relief from a hindsight combination motivated only by the present invention which, even then, would be expected to lead to failure.

In spite of the overwhelming evidence to the contrary, the Examiner finally concludes that it would have been obvious to one of ordinary skill in the art to have performed a pre-hydrating step as taught by Ball et al. in the process of Kinard et al. for forming the high voltage capacitor because the pre-hydrating step allowed depolarization of the existing surface oxide layer enabling the thicker anodized oxide layer to be

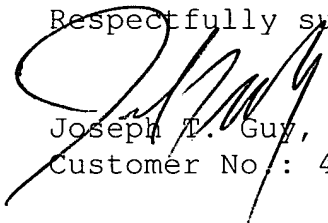
formed. Applicants respectfully disagree for the foregoing reasons.

CONCLUSION

The rejection of all claims has been traversed. Appellants request that all claims be passed to issuance in an expeditious manner.

Respectfully submitted,

March 19, 2007


Joseph T. Guy, Ph.D.
Customer No.: 46591

CLAIMS APPENDIX

- 1.(original) A process for preparing a capacitor comprising:
fabricating an aluminum plate;
pre-hydrating said aluminium plate;
contacting said plate with an anodizing solution comprising
glycerine, about 0.1 to about 2.0%, by weight, water
and about 0.01 to about 0.5%, by weight,
orthophosphate;
applying a voltage to said aluminum plate of at least about
220 volts.
- 2.(original). The process for preparing a capacitor of claim 1
further comprising the step of:
etching said aluminum plate prior to said pre-hydrating of
said aluminum plate.
- 3.(original) The process for preparing a capacitor of claim 1
wherein said voltage is applied in increasing increments
with an age time between each said increment.
- 4.(original) The process for preparing a capacitor of claim 3
wherein said increments are less than about 75 volts.
- 5.(original) The process for preparing a capacitor of claim 4
wherein said increments are at least about 20 V to no more
than about 50 V.

- 6.(original) The process for preparing a capacitor of claim 5 wherein said age time is sufficient for the current to decrease to from about 1 to about 50% of an initial current.
- 7.(original) The process for preparing a capacitor of claim 6 wherein said age time is sufficient for the current to decrease to from about 10 to about 30% of said initial current.
- 8.(original) The process for preparing a capacitor of claim 7 wherein said age time is sufficient for the current to decrease to about 20% of said initial current.
- 9.(original) The process for preparing a capacitor of claim 1 wherein said anodizing solution is at a temperature of about 25°C to about 125°C.
- 10.(original) The process for preparing a capacitor of claim 9 wherein said anodizing solution is at a temperature of about 80°C to about 105°C.
- 11.(original) The process for forming a capacitor of claim 1 wherein said anodizing solution comprises about 0.01 to about 0.1%, by weight, soluble orthophosphate.
- 12.(original) The process for forming a capacitor of claim 1 wherein said soluble orthophosphate is selected from a group consisting of ammonium phosphate, alkali metal phosphate, amine phosphate or mixtures thereof.

- 13.(original) The process for forming a capacitor of claim 1 wherein said soluble orthophosphate is selected from a group consisting of mono-sodium phosphate, di-potassium phosphate, and sodium potassium phosphate.
- 14.(original) The process for forming a capacitor of claim 1 wherein said soluble orthophosphate is selected from a group consisting of mono-ammonium phosphate and di-ammonium phosphate.
- 15.(original) The process for forming a capacitor of claim 1 wherein said anodising solution comprises about 0.1 to about 1%, by weight, water.
- 16-18.(cancelled)
- 19.(original) A process for preparing a capacitor comprising:
- fabricating an aluminum plate;
 - pre-hydrating said aluminium plate;
 - contacting said plate with an anodizing solution comprising glycerine, about 0.1 to about 2.0%, by weight, water and about 0.01 to about 0.5%, by weight, orthophosphate;
 - applying a voltage to said aluminum plate and determining an initial current;
 - maintaining said first voltage until a first measured current is no more than 50% of said initial current;

increasing said voltage and redetermining said initial
current;

maintaining said increased voltage until a second measured
current is no more than about 50% of said redetermined
initial current, and

continuing said increasing said voltage and said maintaining
said increased voltage until a final voltage is
achieved.

20.(original) The process for preparing a capacitor of claim 19
further comprising the step of:

etching said aluminum plate prior to said pre-
hydrating of said aluminum plate.

21.(original) The process for preparing a capacitor of claim 19
wherein said final voltage is above 220 volts.

22.(original) The process for preparing a capacitor of claim 19
wherein said voltage is increased by no more than about 75
volts.

23.(original) The process for preparing a capacitor of claim 22
wherein said voltage is increased by at least about 20 V to
no more than about 50 V.

24.(original) The process for preparing a capacitor of claim 23
wherein said first measured current or said second measured
current is from about 1 to about 50% of said initial
current.

- 25.(original) The process for preparing a capacitor of claim 24 wherein said first measured current or said second measured current is from about 10 to about 30% of said initial current.
- 26.(original) The process for preparing a capacitor of claim 25 wherein said first measured current or said second measured current is about 20% of said initial current.
- 27.(original) The process for preparing a capacitor of claim 19 wherein said anodizing solution is at a temperature of about 25°C to about 125°C.
- 28.(original) The process for preparing a capacitor of claim 27 wherein said anodizing solution is at a temperature of about 80°C to about 105°C.
- 29.(original) The process for forming a capacitor of claim 19 wherein said anodizing solution comprises about 0.01 to about 0.1%, by weight, soluble orthophosphate.
- 30.(original) The process for forming a capacitor of claim 19 wherein said soluble orthophosphate is selected from a group consisting of ammonium phosphate, alkali metal phosphate, amine phosphate and mixtures thereof.
- 31.(original) The process for forming a capacitor of claim 19 wherein said soluble orthophosphate is selected from a group consisting of mono-sodium phosphate, di-potassium phosphate, and sodium potassium phosphate.

32.(original) The process for forming a capacitor of claim 19 wherein said soluble orthophosphate is selected from a group consisting of mono-ammonium phosphate and di-ammonium phosphate.

33-36.(cancelled)

EVIDENCE APPENDIX

None

RELATED PROCEEDINGS APPENDIX

None

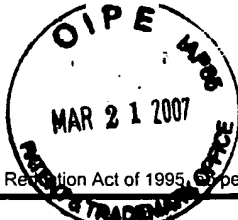
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FEE TRANSMITTAL for FY 2006		Complete if Known		
		Application Number	10/673,816	
<input type="checkbox"/> Applicant claims small entity status. See 37 CFR 1.27		Filing Date	September 29, 2003	
		First Named Inventor	Harrington	
		Examiner Name	Wilkins	
		Art Unit	1742	
TOTAL AMOUNT OF PAYMENT (\$)		\$500.00	Attorney Docket No.	31433-44

METHOD OF PAYMENT (check all that apply)

☐ Check ☐ Credit Card ☐ Money Order ☐ None ☐ Other (please identify): _____
☒ Deposit Deposit Account Number: 08-0719 Deposit Account Name: Nexsen Pruet, LLC

For the above-identified deposit account, the Director is hereby authorized to: (check all that apply)

☒ Charge fee(s) indicated below ☐ Charge fee(s) indicated below, except for the filing fee
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FEE CALCULATION (All the fees below are due upon filing or may be subject to a surcharge.)**1. BASIC FILING, SEARCH, AND EXAMINATION FEES**

Application Type	FILING FEES		SEARCH FEES		EXAMINATION FEES		Fees Paid(\$)
	Fee (\$)	Small Entity Fee (\$)	Fee (\$)	Small Entity Fee (\$)	Fee (\$)	Small Entity Fee (\$)	
Utility	300	150	500	250	200	100	
Design	200	100	100	50	130	65	
Plant	200	100	300	150	160	80	
Reissue	300	150	500	250	600	300	
Provisional	200	100	0	0	0	0	

2. EXCESS CLAIM FEES

Fee Description	Fee (\$)	Small Entity Fee (\$)
Each claim over 20 (including Reissues)	50	25
Each independent claim over 3 (including Reissues)	200	100
Multiple dependent claims	360	180

Total Claims **Extra Claims** **Fee (\$)** **Fee Paid (\$)**
 _____ - 20 or HP = _____ x \$50.00 = \$0.00

HP = highest number of total claims paid for, if greater than 20.

Indep. Claims **Extra Claims** **Fee (\$)** **Fee Paid (\$)**
 _____ - 3 or HP = _____ x \$200.00 = \$0.00

HP = highest number of independent claims paid for, if greater than 3.

3. APPLICATION SIZE FEE

If the specification and drawings exceed 100 sheets of paper (excluding electronically filed sequence or computer listing under 37 CFR 1.52(e)), the application size fee due is \$250 (\$125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).

Total Sheets	Extra Sheets	Number of each additional 50 or fraction thereof	Fee (\$)	Fee Paid (\$)
_____ - 100 =	<u>0</u>	<u>0</u> / 50	<u>0</u> (round up to a whole)	x <u>\$250.00</u> = <u>\$0.00</u>

4. OTHER FEE(S)

Non-English specification, \$130 fee (no small entity discount)

Other (e.g., late filing surcharge): Appeal Brief\$500.00

SUBMITTED BY				
Signature	Registration No. (Attorney/Agent)	35,172	Telephone	864 370-2211
Name (Print/Type)	Joseph T. Guy, Ph.D.		Date	3-19-07

This collection of information is required by 37 CFR 1.136. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 30 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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